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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.         | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------------|------------------|
| 10/728,081  | 12/04/2003  | Lars Lindstrom       | BKP-008                     | 7653             |
| 22832   | 7590        | 04/11/2006           |                             |                  |
| KIRKPATRICK & LOCKHART NICHOLSON GRAHAM LLP<br>STATE STREET FINANCIAL CENTER<br>ONE LINCOLN STREET<br>BOSTON, MA 02111-2950 |             |                      |                             |                  |
|   |             |                      | EXAMINER<br>GEDEON, BRIAN T |                  |
|   |             |                      | ART UNIT<br>3766            | PAPER NUMBER     |

DATE MAILED: 04/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/728,081 | <b>Applicant(s)</b><br>LINDSTROM, LARS |  |
|                              | <b>Examiner</b><br>Brian T. Gedeon   | <b>Art Unit</b><br>3766                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-76 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 10, 21, 30-33, 36, 39, 41-43, 51, 60, 61, 69, and 70 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 8, 9, 11-20, 22-29, 34, 35, 37, 38, 40, 44-50, 52-59, 63-68 and 72-76 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some    \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 21, 30, 41-43 and 51 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lyon (US Patent no. 5,502,663).

Lyon teaches that it is known in the signal filtering art, which it is possible to approximate an ideal filter by deriving a polynomial expansion of the ideal filter coefficients, and the polynomial form allows for the ease of computing the filter coefficients, col 6 lines 37-43. It would also be inherent, if not obvious that a filter could remove unwanted frequencies of a recorded signal by modeling the signal as a polynomial in order to formulate a transfer function or frequency response function from the poles and zeros of the polynomial model, wherein the transfer function allows a corresponding filter to be constructed or synthesized which indicates the general behaviour or frequency response for the filtering system.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (US Patent no. 5,502,663) in view of Kynor et al. (US Patent no. 5,603,321).

Lyon substantially describes the claimed invention except for the removal of background noise or other cardiac artifact from the recorded ECG signal. Kynor et al. describes an apparatus 20 and a method for removing noise artifact from a heart signal recorded by a biomagnetometer 22, col 3 lines 54-61. The cardiac signal can sometime be lost within the noise of the environment, col 1 lines 47-50. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the filter to remove background noise from a recorded heart signal in order to decrease the distortion of the signal from the noise created by the surrounding environment.

3. Claims 3, 4, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (US Patent no. 5,502,663) in view of Arand et al. (US Patent no. 5,318,036).

In regards to claims 2 and 31, Lyon describes the claimed invention except for using the method and device to filter out unwanted components of an ECG signal.

In regards to claims 3 and 32, Lyon describes the claimed invention except for using the method and device to filter out baseline wander from an ECG signal. Arand et al. discloses a method and apparatus for removing baseline wander from an ECG signal, col 3 lines 25-28 and col 4 lines 11-15. Arand et al. also teaches that it is well known in the art to remove baseline wander by the cubic spline method, which employs

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a third order polynomial, col 1 lines 39-42. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made filter remove baseline wander from an ECG signal in order to prevent a decrease in accuracy of the signal.

In regards to claims 4 and 33, Lyon describes the claimed invention except for using the method and device to filter an ECG signal, where the wanted component of the ECG comprises the QRS segment. Arand et al. teaches that it is known in the art that it is common to detect the QRS segment when recording an ECG signal, col 1 lines 44-53. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made exclusively remove all segments, other than the QRS segment, from an ECG signal in order to study ventricle depolarizations.

4. Claims 7 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (US Patent no. 5,502,663) in view of Levine (US Patent no. 5,579,243).

Lyon describes the claimed invention regarding the use of modeling signals as polynomials for filtration. However, Lyon does not describe the use of orthogonal polynomials. Levine describes an apparatus and method implementing a filter synthesizer 10, col 2 lines 57-58, which generates and displays orthogonal polynomials, step 46, col 3 lines 55-65. Therefore it would be obvious to one of ordinary skill in the art at the time the invention was made to use orthogonal polynomials to ensure that the poles and zeros of the transfer function of the filter are stable, thereby resulting in a stable filter.

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5. Claims 10 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (US Patent no. 5,502,663) in view of Levine (US Patent no. 5,579,243) further in view of Kouri et al. (US Patent no. 6,847,737).

Lyon in view of Levine describe the design of a signal filter system that is based on using orthogonal polynomials, in order to ensure stability of the filter. Kouri et al. describes a filter for images, yet it also describes a filtering system based on polynomials in which Legendre and Chebyshev polynomials as the classic systems of polynomials for filters, col 157 lines 19-21. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Legendre or Chebyshev polynomials to design a signal filter since it was know in the art that Legendre and Chebyshev models are considered to the classical polynomial modeling systems.

6. Claims 60, 61, 69, and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (US Patent no. 5,502,663) in view of Corless et al. (US Patent no. 6,988,116).

Lyon et al. describes the invention as claimed except for the summing of the weighting coefficients. Corless et al. describes and audio signal filter which calculates filter coefficients based on polynomial models of the signal, col 2 lines 10-27. The said filter coefficients are multiplied by the input signal and then sent to a summer, col 4 lines 29-59. Therefore it would have been obvious to one of ordinary skill in the art to sum together the filter coefficients in order to provide feedback regarding the output of the system.

***Allowable Subject Matter***

7. Claims 5, 6, 8, 9, 11-20, 22-29, 34, 35, 37, 38, 40, 44-50, 52-59, 62-68, and 71-76 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Gedeon whose telephone number is (571) 272 3447. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert E. Pezzuto can be reached on (571) 272 6996. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Robert E Pezzuto  
Supervisory Patent Examiner  
Art Unit 3766

BTG